

*Lower lake region*: 11th, 24th.

*Upper lake region*: 10th, 11th.

*Upper Mississippi valley*: 1st, 4th, 5th, 8th to 11th.

*Missouri valley*: 1st, 4th, 5th, 7th to 11th, 16th, 25th, 26th.

Thunder-storms were also reported from the following stations, not included in the districts named above: Burlington, Vermont, 11th; Bangor, Maine, 24th; Brackettville, Texas, 26th; Brownsville, Texas, 12th; Cheyenne, Wyoming, 10th, 11th, 15th, 16th; Fort Supply, Indian Territory, 8th, 10th; West Las Animas, Colorado, 10th; Coleman City, Texas, 16th; Fort Davis, Texas, 15th, 16th; Fort Cummings, New Mexico, 7th, 8th; Santa Fé, New Mexico, 8th, 9th; Wellington, Kansas, 8th, 11th; Yates Centre, Kansas, 1st, 4th, 7th to 10th; Pretty Prairie, Kansas, 8th, 10th; Orono, Maine, 24th; Johnsonstown, Virginia, 1st.

During thunder-storms, the following instances of damage by lightning have occurred:

Buffalo, New York, 11th: An extensive malt house at Black Rock, was struck by lightning and damaged.

Ironton, Missouri, 10th: A tramp who had taken shelter under a sand-shed in Arcadia, was injured by lightning; his coat-tail was torn into shreds and his trousers were ripped to the bottom. A large red mark was left on his thigh, and a red streak down his leg.

Lewiston, Maine, 24th: During a hail storm on the afternoon of this date, a barn in Webster county, containing hay, was struck by lightning and set on fire.

Humboldt, Iowa, 11th: A span of horses were struck by lightning, eight miles south of station.

#### OPTICAL PHENOMENA.

##### SOLAR HALOS.

Solar halos have been observed in the various districts, on the following dates:

*New England*: 3d, 7th, 20th, 21st, 25th, 26th, 28th.

*Middle Atlantic States*: 9th, 15th, 21st, 26th, 27th, 28th.

*South Atlantic States*: 12th, 13th, 19th, 20th, 25th, 27th.

*East Gulf States*: 5th, 6th, 9th, 16th, 17th, 18th, 22d, 23d.

*West Gulf States*: 14th, 18th, 21st, 22d, 23d.

*Ohio Valley and Tennessee*: 5th, 8th, 9th, 11th, 16th, 18th, 19th, 20th, 22d to 25th, 27th, 30th.

*Upper Mississippi Valley*: 4th, 8th, 15th, 24th, 27th to 29th.

*Missouri Valley*: 4th, 7th, 8th, 9th, 11th, 13th, 15th, 21st, 23d, 24th, 26th, 30th.

Solar halos were also reported from the following stations, not included in the districts named above: Manitowoc, Wisconsin, 8th; Alpena, Michigan, 1st; New Riegel, Ohio, 15th; Detroit, Michigan, 25th; Toledo, Ohio, 5th; Prescott, Arizona, 21st, 23d; Salt Lake City, Utah, 2d, 23d, 29th, 30th; Colfax, Washington Territory, 8th; Lewiston, Idaho, 2d, 28th; Albany, Oregon, 6th, 7th; San Diego, California, 2d, 3d, 12th; San Francisco, California, 6th, 11th, 14th, 22d, 27th; Carson City, Nevada, 6th, 22d, 25th.

A very remarkable solar halo was observed at 10.00 a. m. of the 7th, on board the s. s. "Ptolemy," in latitude N. 19° 51', longitude W. 37° 21'. The phenomenon preceded a period of tempestuous weather and contrary winds.

##### LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

*New England*: 20th to 23d, 25th to 28th.

*Middle Atlantic states*: 16th, 18th to 25th, 28th.

*South Atlantic states*: 19th, 22d, 23d, 27th.

*East Gulf states*: 2d, 18th, 21st to 24th.

*West Gulf states*: 15th, 17th, 20th to 24th.

*Rio Grande valley*: 14th, 22d, 23d.

*Ohio valley and Tennessee*: 17th to 21st, 23d to 29th.

*Lower lake region*: 3d, 24th to 28th.

*Upper lake region*: 17th, 19th, 20th, 23d, 25th, 29th, 30th.

*Extreme northwest*: 8th, 21st, 22d, 24th, 29th.

*Upper Mississippi valley*: 15th, 20th, 21st, 22d, 24th to 28th, 30th.

*Missouri valley*: 1st, 3d, 18th to 27th, 30th.

*Northern slope*: 17th, 18th, 20th, 25th, 26th, 28th.

*Southern plateau*: 3d, 5th, 20th to 23d, 26th, 28th, 30th.

*Middle plateau*: 2d, 7th, 19th, 23d, 25th, 26th, 28th, 29th, 30th.

*Northern plateau*: 1st, 17th, 20th to 22d, 24th, 26th to 28th.

*North Pacific coast region*: 18th, 19th, 22d to 24th, 26th, 27th, 29th.

*California*: 1st, 5th, 18th, 22d to 25th, 28th.

Lunar halos were also reported from the following stations, not included in the districts named above:

Cedar Keys, Florida, 17th.

Punta Rassa, Florida, 29th.

North Platte, Nebraska, 26th.

Clay Centre, Kansas, 21st, 26th.

Pretty Prairie, Kansas, 24th.

Wellington, Kansas, 23d.

Yates Centre, Kansas, 21st, 26th.

Fort Concho, Texas, 6th, 30th.

Coleman City, Texas, 22d.

##### MIRAGE.

Northport, Michigan: 1st, a mirage was observed here on this date from 9.00 a. m. to 3.30 p. m.; it showed the beach on the opposite side of Traverse Bay so plainly that cattle were seen walking along the shore of Antrim county. The distance across the bay at this place is twelve miles.

Cape Lookout, North Carolina, 23d.

Indianola, Texas, 14th, 20th, 27th to 30th.

Rapid City, Dakota, 29th.

Salina, Kansas, 6th.

Pretty Prairie, Kansas, 6th.

#### MISCELLANEOUS PHENOMENA.

##### SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the twenty-four hours succeeding each observation taken at sunset, have been noted at all Signal Service stations. Reports from one hundred and ninety-one stations show 5,696 observations to have been made, of which forty-two were reported doubtful; of the remainder, 5,654, there were 4,869 or 86.3 per cent., followed by the expected weather.

##### SUN SPOTS.

The following record of observations has been forwarded by Mr. A. S. Bender, of Sacramento, California:

DATE— Nov., 1882.	No. of new		Disappeared by rotation		Reappeared by rotation.		Total No. of		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
3, 4 p. m.	1	1	1	1	.....	.....	6	20†	New group came in by rotation but not reappeared.
4, 4 p. m.	1	10	.....	.....	.....	10	7	40†	Some spots very faint.
5, 4 p. m.	.....	10	2	15†	.....	.....	5	30†	
10, 4 p. m.	1	1	3	20†	.....	.....	2	10†	
11, 4 p. m.	1	1	.....	.....	.....	.....	3	10†	One spot in new group very large.
13, 4 p. m.	1	10	.....	.....	.....	.....	4	20†	
14, 4 p. m.	1	1	1	1	.....	.....	4	20†	Group of 13th seems now to be four large spots.
15, 4 p. m.	.....	.....	1	10†	.....	.....	3	10†	
16, 4.15 p. m.	.....	.....	.....	.....	1	1	4	20†	Number of spots in large group increased.
17, 4.00 p. m.	1	2	1	1	.....	.....	4	15†	Number of spots in large group changing; two very large.
18, 2.45 p. m.	.....	.....	.....	.....	.....	.....	4	10†	Number of spots in large group changing; five very large. The large group visible as one spot to naked eye.
19, 4 p. m.	.....	.....	.....	.....	1	3	5	15†	New group came in by rotation but not reappeared.
20, 4 p. m.	.....	.....	2	5	.....	.....	3	10†	
22, 4 p. m.	2	5	.....	.....	.....	.....	5	15†	
23, 3 p. m.	1	1	.....	.....	.....	.....	6	15†	Do.
26, 3 p. m.	.....	10	.....	.....	.....	.....	6	20†	Number of spots increased.
27, 1.30 p. m.	1	1	.....	.....	.....	.....	7	45†	A large number of new spots visible in groups already noted.
29, 2.45 p. m.	.....	.....	.....	.....	.....	.....	7	60	Do.
30, 4 p. m.	.....	.....	.....	.....	.....	.....	.....	.....	Atmosphere very hazy.

† Estimated.